

## Quality of life in gastric cancer

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### Abstract

**AIM:** To summarize the empirical research on assessing quality of life (QOL) in patients with gastric carcinoma.

**METHODS:** Literature searches were conducted in MedLine from 1966 to February 2004.

**RESULTS:** Twenty-six studies were identified. QOL was used as an outcome measure in virtually all identified studies, such as those examining the effects of gastric cancer and various medical or surgical treatments in the patients. QOL was assessed mainly with generic measures; the social dimensions of QOL were largely neglected. The lack of gastric cancer-specific QOL measures hampers QOL research up to now. The gastric cancer-specific EORTC-QLQ-STO22 and the FACT-Ga are important additions to the arsenal of disease-specific QOL measures. In most of the studies, the label QOL is used for questionnaires, which only assess symptoms or performance status, or are physician-reported rather than patient-reported outcomes.

**CONCLUSION:** QOL in patients with gastric cancer deserves more systematic studies, especially as one of the outcome measures in randomized clinical trials. Results of studies that include QOL in patients with gastric cancer should be applied in clinical care, which aims at improving QOL of these patients.

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**Key words:** Quality of life; Gastric cancer

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### INTRODUCTION

“So, Dormidont Tikhonovich, I came to ask you to come

down and give me a gastrointestinal examination. Any day that suits you, we’ll arrange it.” She looked grey and her voice faltered. Oreshchenkov watched her steadily, his glance never wavering and his angular eyebrows expressing not one millimetre of surprise. “Of course, Ludmila Afanasyevna. We shall arrange the day. However, I should like you to explain what your symptoms are, and what you think about them yourself.” “I’ll tell you my symptoms right away, but as for what I think about them—well, you know, I try not to think about them. That is to say, I think about them all too much, and now I’ve begun not sleeping at nights. The best thing would be if I knew nothing! I’m serious. You decide whether I’m to go into hospital or not and I’ll go, but I don’t want to know the details. If I’m to have an operation I would rather not know the diagnosis, otherwise I’ll be thinking the whole time during the operation, “What on earth are they doing to me now? What are they taking out now?” Do you understand?”<sup>[1]</sup>

In medical care for patients with (gastric) cancer, the 5-year survival is a crucial outcome. At the same time, quantity of survival is increasingly supplemented by data on quality of survival. In this journal, for example, 15 articles that are retrieved under the search heading ‘gastric cancer and quality of life’ have all been published since 1998. Defining quality of life (QOL) is a complex matter, a universally accepted definition does not exist<sup>[2]</sup>. Schipper *et al*<sup>[3]</sup>, proposed “the functional effect of an illness and its consequent therapy upon a patient, as perceived by the patient”. Functional effects usually are separated into three categories: physiological, psychological, and social. QOL, therefore, is a multidimensional construct. In a patient with gastric cancer, a physiological effect might be nausea or problems with swallowing, and a psychological effect could be depression, and a social effect might be withdrawal due to embarrassment about being ill. Sometimes economic effects are also discussed in the context of functional effects of illness<sup>[2]</sup>. There is also a discussion about spiritual effect of illness<sup>[4]</sup>. In general, however, the triad ‘physiological’, ‘psychological’, and ‘social’ effects is considered to represent the QOL.

QOL can be assessed using generic or disease-specific measures. Generic measures are used in every conceivable disease or disorder. Scores on those measures allow comparisons between groups of patients with an identical diagnosis but with different grades of severity or in different settings or countries, between two groups of patients with different diseases, or between a group of patients with a disease and persons without disease. Disease-specific measures have been designed to particularly assess QOL of patients with a specific disease. For example, in patients with Crohn’s disease, the IBS-QOL is a disease-specific QOL measure<sup>[5]</sup>, and the SF-36 is a generic QOL measure<sup>[6]</sup>.

Cancer-generic measures (e.g., EORTC-QLQ-C30) assess QOL across various diagnostic cancer categories<sup>[7]</sup>. EORTC and FACIT have developed a wide range of questionnaires that assess QOL for various specific cancer types (visit [www.eortc.be](http://www.eortc.be) and [www.facit.org/qlist.aspx](http://www.facit.org/qlist.aspx))<sup>[8]</sup>.

QOL is not a 'soft' measure. If surgical technique A results in a similar 5-year survival as surgical technique B, differences in aspects of QOL, such as nausea, depression, and embarrassment, may determine which surgical technique is preferable. This view has been previously described in the area of gastroenterology, e.g., in functional bowel syndrome<sup>[9]</sup>. In gastric cancer, however, the topic of QOL is virtually unexplored. Recent reviews of gastric cancer in major journals do not mention QOL at all, let alone discussing QOL in the context of one of the outcome measures<sup>[10]</sup>. This is in sharp contrast with the area of QOL and, for instance, breast cancer. In this area, QOL is assessed with well-developed and validated measures, and QOL is a major outcome variable, which also influences the choice of medical management<sup>[11]</sup>.

In this paper, our aim is to review all empirical studies on the topic of gastric cancer and QOL, with a view to outline strengths and weaknesses in the empirical material available, and to suggest some future research avenues.

to February 2004, with Mesh headings 'gastric cancer' and 'quality of life', and 'gastric cancer' and 'psychology'. References in the retrieved papers were studied meticulously, and 'snowballing' produced additional papers. Only papers in English were selected. Excluded were studies on mixed diagnostic groupings, i.e., patients with gastric cancer were part of a large group of patients with various other types of (usually gastrointestinal) cancer, or that dealt with QOL, but only symptoms were measured, where only one of the three core QOL domains was assessed, or where QOL was not a patient-reported outcome but merely a physician-reported outcome<sup>[12]</sup>. Given the high prevalence of gastric cancer in Japan, an additional literature search was carried out in Ichushi-WEB, one of the largest literature searches in Japan of original papers, case reports and minutes of meetings held in Japan, which can be searched.

Empirical studies were analyzed according to first author and year of publication, country where the study was conducted, diagnosis or diagnostic category, study objective (s), number of patients and sociodemographic details, measure(s) used to assess QOL, results, domains in the QOL assessment, type of scale (generic, cancer-generic, or disease-specific), and remarks (on weaknesses in the study). The results are summarized in Table 1.

## MATERIALS AND METHODS

Literature searches were conducted in MedLine from 1966

## RESULTS

The literature searches plus extensive and detailed studying

**Table 1** Summary of the 26 studies on QOL in gastric cancer

First author, yr	Country	Diagnosis	Objective(s)	N patients, age, yr, ♂; ♀	QOL measure(s)	Result(s) regarding QOL	Domains	Type(s) of questionnaires	Remarks
Adachi, 1999 <sup>[15]</sup>	Japan	Early gastric cancer	Evaluate QOL after laparoscopic assisted vs conventional gastrectomy	76-64±10 (mean) ♂ 44; ♀ 32	Mailed questionnaire, 24 items (cf. Korenaga 1992 <sup>[28]</sup> ) 'QOL', dumping syndrome	Laparoscopic-assisted gastrectomy patients: QOL ↑	PHY: eating PSY: fatigue, pain SOC: -	Gastric-Spec-H, C-Gen	No Bonferroni correction for multiple testing, no social dimension in QOL, non-randomized design
Anderson, 1995 <sup>[16]</sup>	Scotland	Adenocarcinoma of the stomach	Examine relief of symptoms after surgical treatment	57 67 (median) 48-88 (range) ♂ 35; ♀ 22	Symptom list scored via interviews	After surgery: symptoms ↓	PHY: dysphagia, dyspepsia PSY: pain SOC: -	Gastric-Spec-H	-
Buhl, 1990 <sup>[17]</sup>	Germany	Gastric cancer	Evaluate QOL after subtotal vs total gastrectomy	89-61±13 (mean) ♂ - ♀ : n.r.	Troidl questionnaire: disease-specific and socio-personal dimensions; psychological problems (Horowitz scale; Zerrsen	No significant differences between groups	PHY: eating PSY: intrusion, avoidance, fatigue, pain, depression SOC: -	Disease specific, H	Of the six measures, only three assessed QOL; no correlation between objective and subjective measures; no social

					scale)				dimension
Davies, 1998 <sup>[18]</sup>	UK	Gastric carcinoma	Evaluate QOL after subtotal <i>vs</i> total gastrectomy	47 69 (median) 33–84 (range) ♂ 27; ♀ 20	ADL, HAD, RSCL, Troidl	QOL ↑ in subtotal gastrectomy	Full blown QOL: PHY, PSY, SOC	Cancer generic, gastric cancer specific, H	Non-randomized design
Eguchi, 2003 <sup>[19]</sup>	Japan	Gastric cancer	Examine effects of docetaxel+5FU on survival and QOL	5 64 (mean) 57–70 (range) ♂ 4; ♀ 1	EORTC-QOL-C30	QOL ↑	Full blown QOL: PHY, PSY, SOC	Cancer generic	QOL is secondary endpoint
Fuchs, 1995 <sup>[20]</sup>	Germany	Gastric cancer	QOL as one of the outcome measures in two surgical procedures (JIP <i>vs</i> RYP)	120 58 (mean) ♂ 78; ♀ 42	Spitzer and Visick questionnaires: both patient scored	No differences between procedures	PHY: functional status PSY: activities SOC: support	Cancer generic	Interesting: Spitzer and Visick were patient scored; randomized design
Hoffman, 1998 <sup>[21]</sup>	Sweden	Gastric cancer	Assess relevance of Clinical Benefit Response (CBR) criteria for effectiveness of chemotherapy	61 63 (median) 40–75 (range) ♂ - ♀ : n.r.	EORTC-QOL-C30, QLQ-C13 items, symptoms → translated into CBR	Patients' views, doctors' views and CBR: similar results	Full blown QOL: PHY, PSY, SOC	Cancer generic, gastric cancer specific, H	CBR reflects combination of objective and subjective changes; retrospective design
Hoksch, 2002 <sup>[22]</sup>	Germany	Gastric cancer	Assess QOL after gastrectomy, with different types of reconstruction (IPP, IPP7, IPP15)	41-59 (mean) 25–74 (range) ♂ 20; ♀ 21	EORTC-QLQ-C30, food consumption	No major differences, except for 'global health status' (IPP15 ↑)	Full blown QOL: PHY, PSY, SOC	Cancer generic, gastric cancer specific, H	Prospective randomized trial; QOL was target of trial
Horváth, 2001 <sup>[23]</sup>	Hungary	Total gastrectomy	Assess QOL (aboral pouch, R-and-Y)	46 60 (median) 26-80 (range) ♂ 24; ♀ 22	GIQLI	In aboral pouch: QOL ↑	Full blown QOL: PHY, PSY, SOC	Disease specific for gastrointestinal disorders in general	Randomized controlled study
Ishihara, 1999 <sup>[24]</sup>	Japan	Stomach cancer	Evaluate QOL and ADL ≥ 2 yr after total gastrectomy	51 67 (mean) 39–82 (range) ♂ 32; ♀ 19	QLI, dumping symptoms	QOL ↓	PHY: physical strength PSY: fatigue, anxiety SOC: –	Cancer generic, H; gastric cancer specific, H	Validity?
Jentschura, 1997 <sup>[25]</sup>	Germany	Gastric carcinoma	Effects of subtotal <i>vs</i> total gastrectomy on QOL	195 61 (mean) ♂ 122; ♀ 73	GIQLI	Subtotal gastrectomy better QOL	Full blown QOL: PHY, PSY, SOC	Questionnaire designed for assessing gastrointestinal symptoms	Non-randomized design
Kalmár, 2001 <sup>[26]</sup>	Hungary	Adenocarcinoma of the stomach	Aboral pouch <i>vs</i> total gastrectomy re QOL	40 -60±9 ♂ 19; ♀ 21	GIQLI	Pouch better QOL	Full blown QOL: PHY, PSY, SOC	See Jentschura 1997 <sup>[25]</sup>	Randomized trial; see also Horváth <i>et al.</i> , 2001 <sup>[23]</sup>
Kono, 2003 <sup>[27]</sup>	Japan	Early gastric cancer	R-en- Y <i>vs</i> pouch re QOL	47 -66±11 ♂ 32; ♀ 15	GSRS and symptoms	Pouch better QOL (at 3 mo; not at 12 or 48 mo)	PHY: reflux PSY: pain SOC: –	Disease specific for gastrointestinal disorders in general	Randomized controlled study; author modified GSRS; no social dimension
Korenaga, 1992 <sup>[28]</sup>	Japan	Gastric cancer	Retrospective QOL assessment after gastrectomy	150 ≤ 59:89 ≥ 60:61 ♂ 97; ♀ 53	QOL: symptoms via interview (cf. Adachi <i>et al.</i> , 1999 <sup>[15]</sup> )	Food tolerance ↓ Appetite ↓	PHY: eating PSY: appetite SOC: – See Adachi <i>et al.</i> ,	Gastric cancer specific, H	QOL?

de Líaño, 2003 <sup>[29]</sup>	Spain	Gastric cancer	Assess QOL after curative resection	54 67 (mean) 41–89 (range) ♂ 36; ♀ 18	EORTC-QLQ-C30, and disease-specific questions	QOL-social ↓	1999 <sup>[15]</sup> Full blown QOL: PHY, PSY, SOC	Cancer generic and disease specific	No correlation between tumor stage and QOL
Liedman, 2001 <sup>[30]</sup>	Sweden	Gastric cancer	To examine relations between clinical nutritional parameters and QOL after gastrectomy	32 66 (mean) 41–82 (range) ♂ 21; ♀ 11	BSS, CPRS, GSRS (gastric symptoms), MACL, SIP, SSIAM	Strong correlations between change in body composition and QOL	Full blown QOL: PHY, PSY, SOC	Generic and gastric symptoms specific	–
Miyoshi, 2001 <sup>[31]</sup>	Japan	Gastric cancer	Compare long-term results regarding symptoms and nutritional status in patients with/without pouch	34 -63±12 ♂ 22; ♀ 12	GSRS and symptoms	Pouch: QOL ↑	PHY: pain, reflux PSY: eating SOC: –	Gastric symptoms questionnaire	QOL?
Nakano, 1999 <sup>[32]</sup>	Japan	Unresectable gastric cancer and postoperative gastric cancer	Effects of Lentinan on survival and QOL	45 -64 (mean) 45–75 (range) ♂ 34; ♀ 11	Homemade QOL questionnaire	Lentinan: QOL ↑	Full blown QOL: PHY, PSY, SOC	Disease specific questionnaire (14 items)	Validity of QOL scale?
Shiraishi, 2002 <sup>[33]</sup>	Japan	Gastrectomy	Compare QOL among three surgical techniques	51 -63±11 ♂ 37; ♀ 14	Adachi 1999 <sup>[15]</sup> questionnaire: 24 items on symptoms	Gastric tube reconstruction: best QOL; no other differences in QOL between techniques	Full blown QOL: PHY, PSY, SOC	Gastric cancer specific, H	Validity? see Adachi 1999 <sup>[15]</sup>
Svedlund, 1999 <sup>[34]</sup> (see also Svedlund, 1997 <sup>[35]</sup> )	Sweden	Subtotal <i>vs</i> total gastrectomy	Examine impact of gastrectomy procedures on QOL	64 67 (mean) ♂ 39; ♀ 25	BSS, CPRS, EDs, GSRS, MACL, SIP, SSIAM	Physical QOL categories negatively impaired	Full blown QOL: PHY, PSY, SOC	Disease generic; gastric symptoms specific; gastric cancer specific symptoms	One of the few follow-up studies in this area; prospective randomized trial; psychiatric focus
Svedlund, 1996 <sup>[36]</sup>	Sweden	Gastrectomy	QOL before gastrectomy	103 72 (mean) ♂ 60; ♀ 43	BSS, MACL, SIP	Patients <i>vs</i> healthy controls: QOL ↓; 25% report functional limitations	Full blown QOL: PHY, PSY, SOC	Generic and symptom specific	Comparison of gastric cancer patients with other patient groups
Thybusch-Bernhardt, 1999 <sup>[37]</sup>	Germany	Total gastrectomy and D2 lymphadenectomy	Effects on QOL following surgical procedures	62 63 (mean) 32–80 (range) ♂ 40; ♀ 22	EORTC-QLQ-C30 and gastric cancer module	No major differences in QOL between procedures	Full blown QOL: PHY, PSY, SOC	Cancer generic; gastric cancer specific, H	Non-randomized design
Troidl, 1987 <sup>[38]</sup>	Germany	Gastric cancer	Esophago-jejunostomy <i>vs</i> Hunt-Lawrence-Rodino pouch on QOL	38 -69 (median) 41–75 (range) ♂ 23; ♀ 15	Troidl questionnaire: 11 items, “disease specific” and “socio-personal”	HLR: QOL ↑	PHY: daily activities PSY: fatigue SOC: –	Disease specific symptoms, H	Randomized trial, no social dimension; validity?
Vickery, 2001 <sup>[39]</sup>	France, Germany, Spain, UK	Gastric cancer	Develop disease-specific QOL questionnaire	115 66 (mean) 35–97 (range)	22-item EORTC -QLQ-STO22	5 scales, 4 items	Full blown QOL: PHY, PSY, SOC	Disease specific QOL questionnaire	First formal disease-specific QOL

			♂ 75; ♀ 40						instrument for gastric cancer
Yamaoka, Japan 1998 <sup>[40]</sup>	Gastrectomy	Examine effects	207	EPQ,	Relationships	Full blown QOL:	Disease generic	Interesting	
		of personality on	-57 (mean)	HRQOL-20	between	PHY, PSY, SOC	scale, H; generic	theoretical	
		HRQOL	32-83 (range)		personality		questionnaire	extension: examine personality factors	
			♂ 140; ♀ 67						
Zieren, Germany 1998 <sup>[41]</sup>	Gastric carcinoma	Compare Spitzer	71	EORTC-	Physical	Full blown QOL:	Cancer	-	
		with EORTC-QOL	59 (mean)	QLQ-C36	functioning	PHY, PSY, SOC	generic		
		-C36, after resection	27-77 (range)		most limited		questionnaire		
			♂ 47; ♀ 24						

ADL, activities of daily living; BSS, body symptom scale; C, cancer; C-Gen, cancer generic; CBR, clinical benefit response; CPRS, comprehensive psychopathological rating scale; EDS, eating dysfunction scale; EORTC-QLQ-C36, EORTC, QLQ, cancer 36 items; EORTC-QLQ-STO22, EORTC, QLQ, stomach cancer 22 items; EORTC-QOL-C30, European Organization for Research and Treatment of Cancer, QOL, cancer 30 items; EPQ, Eysenck Personality Questionnaire; Gastric-Spec-H, gastric cancer specific, home made; Gen, generic; GIQLI, gastrointestinal quality of life index; GSRS, gastrointestinal symptom rating scale; H, home made; HAD, hospital anxiety depression; HRQOL-20, health related quality of life, 20 items; IPP, Longmire's reconstruction without a pouch; JIP, jejunal interposition with pouch; MACL, mood adjective check list; PHY, physical; PSY, psychological; QLL, quality of living index; QLQ-C13, Quality of Life Questionnaire, cancer 13 items; QOL, quality of life; RSCL, Rotterdam Symptom Check List; RYP, Roux-en-Y reconstruction; SIP, sickness impact profile; SOC, social; Spec, specific; SSIAM, structured and scaled interview to assess maladjustments.

of the references resulted in 26 studies that fitted our selection criteria (Table 1).

The year 1987 saw the publication of the first empirical paper on QOL in gastric cancer: Troidl and colleagues published their QOL questionnaire, which seems to have been very useful to quite a few researchers later<sup>[38]</sup>. The 26 studies pertain to a 17-year period; on average, every 8 mo a study was published. It is rather striking to note that we did not find a paper from North America; 17 papers are from European countries and 9 from Japan. Since our focus is on QOL assessment, we did not specify in great detail diagnosis, diagnostic categories, surgical or other medical procedures. Virtually all studies aimed at assessing QOL as an outcome for medical care. The number of patients in the studies ranged from 5 to 207.

A great variety of QOL instruments are reported in the 26 studies. The column in Table 1, which summarizes the QOL questionnaires, illustrates the relatively new status of QOL research in gastric cancer. Homemade questionnaires, questionnaires that assess performance status, and questionnaires not designed specifically for (gastric) cancer patients, are applied quite frequently. The increasing use of the cancer-specific, but gastric cancer generic EORTC-QLQ-C30 questionnaire is a positive development. This is a measure with adequate psychometric characteristics and it allows comparisons between gastric cancer patients with other categories of cancer patients. The majority of studies cover physical and psychological functioning; social functioning is assessed somewhat less frequently. The authors of the reviewed papers sometimes label questionnaires as assessing 'quality of life', where they are in fact physician-reported scores (e.g., the Karnofsky, Spitzer, and Visick questionnaires) which by definition is not quality of life.

The search in Ichushi-WEB produced 119 original papers and 94 original case reports hits. Of the 119 studies, 8 assessed QOL of patients using a QOL questionnaire. Almost all questionnaires were homemade ones, and only three studies

used a cancer-specific core questionnaire developed in Japan by standardized psychometric testing<sup>[42]</sup>. The three studies were all published in the Japanese Journal of Cancer Chemotherapy, in Japanese<sup>[43-45]</sup>.

## DISCUSSION

QOL in patients with gastric cancer is increasingly added as an outcome measure in clinical research. Over half of the studies in the review are recent (>1998 or later) studies. This development is in line with other areas in medicine<sup>[46,47]</sup>. In most of the reviewed studies, QOL was used to evaluate the effects of medical treatment, usually after some form of surgery or chemotherapy. So far, there are no studies on prediction of QOL or on determinants of QOL in the area of gastric cancer. Another finding of our review reflects the coming of age of QOL research in gastric cancer: physiological functioning is included in virtually all studies, psychological functioning is included in about half of the studies, and social functioning is hardly included at all. Clearly, future research must take this result into account. Using symptom scores as a measure of QOL is not appropriate any longer-it reflects a rather strict biomedical model of thinking, while QOL research aims to further develop a biopsychosocial model of medicine<sup>[48]</sup>.

Using only traditional outcome criteria such as response rate or objective tumor regression, for example in patients with solid tumors of the lung, colon or breast, is hardly valid any more in modern research on the outcome in cancer (cf. RECIST<sup>[48]</sup>). This is especially the case in patients with gastric cancer as over one-third of those patients have non-measurable disease (e.g., ascites, lymphangitis carcinomatosa, miliary liver metastasis). The concept of 'clinical benefit response' (CBR) as a potential addition to QOL deserves mention in this regard<sup>[49,50]</sup>. CBR combines objective with subjective measures to assess changes in the clinical status of patients.

The recent publication of the EORTC-QLQ-STO22 questionnaire signals a major improvement in the field of assessing QOL in patients with gastric cancer<sup>[39]</sup>. The questionnaire has five scales (dysphagia, pain, diet, symptoms, emotional problems), and four single items (dry mouth, body image, and hair loss (two items)). The rigorous psychometric testing procedures of the EORTC QOL group suggest that the STO22 will no doubt become one of the standards for assessing QOL in this category of patients. Given the robust nature of this questionnaire, future research will allow examining correlates and predictors of QOL in various domains, e.g., physiological, psychological, and social. Routinely incorporating the STO22 in clinical research on gastric cancer will improve our knowledge on the impact of gastric cancer and its treatment as perceived by the patient<sup>[51,52]</sup>.

In addition to the EORTC-QLQ-STO22, which is a European-based questionnaire, the FACT-Ga, which was developed in USA, also assesses QOL in patients with gastric cancer. The FACT-Ga as a cancer generic QOL questionnaire has 27 items covering four subscales that assess physical, social/family, emotional, and functional well-beings<sup>[8]</sup>. The gastric cancer-specific FACT-Ga is under construction and will be available shortly. Dumping syndrome (e.g., postprandial dizziness, cold perspiration) can also be considered when assessing QOL, as addition to gastric cancer-specific QOL questionnaires<sup>[50]</sup>.

The ultimate study will examine the research question: How can we improve QOL in patients with gastric cancer? Medical care has the power to improve QOL. Other treatment strategies may also help improve QOL: self-management training, skills training, and support groups have shown to produce improvements in QOL<sup>[53]</sup>. In gastric cancer patients, the study by Persson and Glimelius illustrated the positive effects on QOL of a group rehabilitation program combined with individual support<sup>[54]</sup>. The study by Kuchler *et al*<sup>[55]</sup>, is a hallmark paper in this regard. In this study, patients with gastrointestinal cancer were randomly allocated to standard care *vs* additional psychotherapeutic support. Patients in the experimental group survived longer than in the 'care as usual' group. Generally, recent meta-analyses demonstrated the positive effects of psychosocial care for cancer patients, as gauged by improvements in QOL<sup>[56,57]</sup>. Patients, physicians and researchers, therefore, may benefit from developing psychosocial support programs and from examining their effects on behavioral and medical outcomes.

A number of authors emphasize the importance of paying attention to QOL, given the important but as yet relatively modest effects of surgery, chemotherapy or radiotherapy in gastric cancer in particular. Bozzetti writes, "we think that when two surgical procedures are compared, if the oncological results are the same, the operation which is associated with least discomfort and impairment of QOL, should be chosen"<sup>[61]</sup>. Our review indicates how in empirical studies on gastric cancer QOL has been addressed, assessed and evaluated. Choosing a questionnaire to assess QOL depends entirely on the study topic. There is no 'best' QOL questionnaire for patients with gastric cancer. The research question and clinical objectives determine the choice of the QOL instruments. The recent publication of the

EORTC-QLQ-STO22 is a breakthrough. However, additional questionnaires are needed to answer specific research questions or to explore other psychosocial issues in patients with gastric cancer, e.g., demand for information by patients or on the partner's concern and worries<sup>[58-60]</sup>. Improving the medical care for patients with gastric cancer will ultimately be judged by improvement in survival and QOL. The quotation from 'Cancer Ward' at the beginning of our paper intended to help focus our attention on the goal of health care: to help people live longer and feel better<sup>[61-64]</sup>.

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## REFERENCES

- 1 **Solzhenitsyn A**. Cancer ward. Harmondsworth, UK: Penguin Books, 1971
- 2 **Spilker B**, ed. Quality of life and pharmacoeconomics in clinical trials. Philadelphia: Lippincott-Raven, 1996
- 3 **Schipper H**, Clinch J, Olweny LM. Definitions and conceptual issues. In: Spilker B, ed. Quality of life and pharmacoeconomics in clinical trials. Philadelphia: Lippincott-Raven, 1996: 11-24
- 4 **van Wegberg B**, Bacchi M, Heusser P, Helwig S, Schaad R, von Rohr E, Bernhard J, Huerny C, Castiglione M, Cerny T. The cognitive-spiritual dimension--an important addition to the assessment of quality of life: validation of a questionnaire (SELT-M) in patients with advanced cancer. *Ann Oncol* 1998; **9**: 1091-1096
- 5 **Drossman DA**, Patrick DL, Whitehead WE, Toner BB, Diamant NE, Hu Y, Jia H, Bangdiwala SI. Further validation of the IBS-QOL: a disease-specific quality-of-life questionnaire. *Am J Gastroenterol* 2000; **95**: 999-1007
- 6 **BlondeI-Kucharski F**, Chircop C, Marquis P, Cortot A, Baron F, Gendre JP, Colombel JF. Health-related quality of life in Crohn's disease: a prospective longitudinal study in 231 patients. *Am J Gastroenterol* 2001; **96**: 2915-2920
- 7 **Aaronson NK**, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, Filiberti A, Flechtner H, Fleishman SB, de Haes JC. The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. *J Natl Cancer Inst* 1993; **85**: 365-376
- 8 **Cella DF**, Tulsky DS, Gray G, Sarafian B, Linn E, Bonomi A, Silberman M, Yellen SB, Winicour P, Brannon J. The Functional Assessment of Cancer Therapy scale: development and validation of the general measure. *J Clin Oncol* 1993; **11**: 570-579
- 9 **Drossman DA**, Toner BB, Whitehead WE, Diamant NE, Dalton CB, Duncan S, Emmott S, Proffitt V, Akman D, Frusciant K, Le T, Meyer K, Bradshaw B, Mikula K, Morris CB, Blackman CJ, Hu Y, Jia H, Li JZ, Koch GG, Bangdiwala SI. Cognitive-behavioral therapy versus education and desipramine versus placebo for moderate to severe functional bowel disorders. *Gastroenterology* 2003; **125**: 19-31
- 10 **Hohenberger P**, Gretscher S. Gastric cancer. *Lancet* 2003; **362**: 305-315
- 11 **Bottomley A**, Therasse P. Quality of life in patients undergoing systemic therapy for advanced breast cancer. *Lancet Oncol* 2002; **3**: 620-628
- 12 **Bamias A**, Hill ME, Cunningham D, Norman AR, Ahmed FY, Webb A, Watson M, Hill AS, Nicolson MC, O'Brien ME, Evans TC, Nicolson V. Epirubicin, cisplatin, and protracted venous infusion of 5-fluorouracil for esophagogastric

- adenocarcinoma: response, toxicity, quality of life, and survival. *Cancer* 1996; **77**: 1978-1985
- 13 **Glimelius B**, Ekström K, Hoffman K, Graf W, Sjöden PO, Haglund U, Svensson C, Enander LK, Linné T, Sellström H, Heuman R. Randomized comparison between chemotherapy plus best supportive care with best supportive care in advanced gastric cancer. *Ann Oncol* 1997; **8**: 163-168
  - 14 **Dent DM**, Werner ID, Novis B, Cheverton P, Brice P. Prospective randomized trial of combined oncological therapy for gastric carcinoma. *Cancer* 1979; **44**: 385-391
  - 15 **Adachi Y**, Suematsu T, Shiraishi N, Katsuta T, Morimoto A, Kitano S, Akazawa K. Quality of life after laparoscopy-assisted Billroth I gastrectomy. *Ann Surg* 1999; **229**: 49-54
  - 16 **Anderson ID**, MacIntyre IM. Symptomatic outcome following resection of gastric cancer. *Surg Oncol* 1995; **4**: 35-40
  - 17 **Buhl K**, Schlag P, Herfarth C. Quality of life and functional results following different types of resection for gastric carcinoma. *Eur J Surg Oncol* 1990; **16**: 404-409
  - 18 **Davies J**, Johnston D, Sue-Ling H, Young S, May J, Griffith J, Miller G, Martin I. Total or subtotal gastrectomy for gastric carcinoma? A study of quality of life. *World J Surg* 1998; **22**: 1048-1055
  - 19 **Eguchi T**, Fujii M, Wakabayashi K, Aisaki K, Tsuneda Y, Kochi S, Takayama T. Docetaxel plus 5-fluorouracil for terminal gastric cancer patients with peritoneal dissemination. *Hepatogastroenterology* 2003; **50**: 1735-1738
  - 20 **Fuchs KH**, Thiede A, Engemann R, Deltz E, Stremme O, Hamelmann H. Reconstruction of the food passage after total gastrectomy: randomized trial. *World J Surg* 1995; **19**: 698-705; discussion 705-706
  - 21 **Hoffman K**, Glimelius B. Evaluation of clinical benefit of chemotherapy in patients with upper gastrointestinal cancer. *Acta Oncol* 1998; **37**: 651-659
  - 22 **Hokschi B**, Ablassmaier B, Zieren J, Mueller JM. Quality of life after gastrectomy: Longmire's reconstruction alone compared with additional pouch reconstruction. *World J Surg* 2002; **26**: 335-341
  - 23 **Horváth OP K**, Cseke L, Poto L, Zambo K. Nutritional and life-quality consequences of aboral pouch construction after total gastrectomy: a randomized, controlled study. *Eur J Surg Oncol* 2001; **27**: 558-563
  - 24 **Ishihara K**. Long-term quality of life in patients after total gastrectomy. *Cancer Nurs* 1999; **22**: 220-227
  - 25 **Jentschura D**, Winkler M, Strohmeier N, Rumstadt B, Hagmueller E. Quality-of-life after curative surgery for gastric cancer: a comparison between total gastrectomy and subtotal gastric resection. *Hepatogastroenterology* 1997; **44**: 1137-1142
  - 26 **Kalmar K**, Cseke L, Zambo K, Horvath OP. Comparison of quality of life and nutritional parameters after total gastrectomy and a new type of pouch construction with simple Roux-en-Y reconstruction: preliminary results of a prospective, randomized, controlled study. *Dig Dis Sci* 2001; **46**: 1791-1796
  - 27 **Kono K**, Iizuka H, Sekikawa T, Sugai H, Takahashi A, Fujii H, Matsumoto Y. Improved quality of life with jejunal pouch reconstruction after total gastrectomy. *Am J Surg* 2003; **185**: 150-154
  - 28 **Korenaga D**, Orita H, Okuyama T, Moriguchi S, Maehara Y, Sugimachi K. Quality of life after gastrectomy in patients with carcinoma of the stomach. *Br J Surg* 1992; **79**: 248-250
  - 29 **Diaz De Liano A**, Oteiza Martinez F, Ciga MA, Aizcorbe M, Cobo F, Trujillo R. Impact of surgical procedure for gastric cancer on quality of life. *Br J Surg* 2003; **90**: 91-94
  - 30 **Liedman B**, Svedlund J, Sullivan M, Larsson L, Lundell L. Symptom control may improve food intake, body composition, and aspects of quality of life after gastrectomy in cancer patients. *Dig Dis Sci* 2001; **46**: 2673-2680
  - 31 **Miyoshi K**, Fuchimoto S, Ohsaki T, Sakata T, Ohtsuka S, Takakura N. Long-term effects of jejunal pouch added to Roux-en-Y reconstruction after total gastrectomy. *Gastric Cancer* 2001; **4**: 156-161
  - 32 **Nakano H**, Namatame K, Nemoto H, Motohashi H, Nishiyama K, Kumada K. A multi-institutional prospective study of lentinan in advanced gastric cancer patients with unresectable and recurrent diseases: effect on prolongation of survival and improvement of quality of life. Kanagawa Lentinan Research Group. *Hepatogastroenterology* 1999; **46**: 2662-2668
  - 33 **Shiraishi N**, Adachi Y, Kitano S, Kakisako K, Inomata M, Yasuda K. Clinical outcome of proximal versus total gastrectomy for proximal gastric cancer. *World J Surg* 2002; **26**: 1150-1154
  - 34 **Svedlund J**, Sullivan M, Liedman B, Lundell L. Long term consequences of gastrectomy for patient's quality of life: the impact of reconstructive techniques. *Am J Gastroenterol* 1999; **94**: 438-445
  - 35 **Svedlund J**, Sullivan M, Liedman B, Lundell L, Sjödin I. Quality of life after gastrectomy for gastric carcinoma: controlled study of reconstructive procedures. *World J Surg* 1997; **21**: 422-433
  - 36 **Svedlund J**, Sullivan M, Sjödin I, Liedman B, Lundell L. Quality of life in gastric cancer prior to gastrectomy. *Qual Life Res* 1996; **5**: 255-264
  - 37 **Thybusch-Bernhardt A**, Schmidt C, Kuechler T, Schmid A, Henne-Bruns D, Kremer B. Quality of life following radical surgical treatment of gastric carcinoma. *World J Surg* 1999; **23**: 503-508
  - 38 **Troidl H**, Kusche J, Vestweber KH, Eypasch E, Maul U. Pouch versus esophagojejunostomy after total gastrectomy: a randomized clinical trial. *World J Surg* 1987; **11**: 699-712
  - 39 **Vickery CW**, Blazeby JM, Conroy T, Arraras J, Sezer O, Koller M, Rosemeyer D, Johnson CD, Alderson D. Development of an EORTC disease-specific quality of life module for use in patients with gastric cancer. *Eur J Cancer* 2001; **37**: 966-971
  - 40 **Yamaoka K**, Shigehisa T, Ogoshi K, Haruyama K, Watanabe M, Hayashi F, Hayashi C. Health-related quality of life varies with personality types: a comparison among cancer patients, non-cancer patients and healthy individuals in a Japanese population. *Qual Life Res* 1998; **7**: 535-544
  - 41 **Zieren HU**, Zippel K, Zieren J, Müller JM. Quality of life after surgical treatment of gastric carcinoma. *Eur J Surg* 1998; **164**: 119-125
  - 42 **Kurihara M**, Shimizu H, Tsuboi K, Kobayashi K, Murakami M, Eguchi K, Shimozuma K. Development of quality of life questionnaire in Japan: quality of life assessment of cancer patients receiving chemotherapy. *Psychooncology* 1999; **8**: 355-363
  - 43 **Saji S**, Toge T, Kurosu Y, Hirata K, Gochi A, Tominaga S, Inokuchi K. Interim report of JFMC study no. 23 -phase III randomized clinical trial on the effectiveness of low-dose cisplatin plus 5-FU as a postoperative adjuvant chemotherapy for advanced gastric cancer. *Gan To Kagaku Ryoho* 2002; **29**: 2499-2507
  - 44 **Toge T**, Fujita M, Hirata K, Kunii Y, Kitamura M, Nagawa H, Kubota T, Wakasugi J, Kasai Y, Takahashi Y, Furukawa H, Takao T, Kaibara N, Takashima S, Kakegawa T, Tomita M, Nose Y. Interim report of JFMC study no. 20 on the effectiveness of high dose CDDP plus 5-FU regimen as an adjuvant therapy for far-advanced cancer of the stomach. *Gan To Kagaku Ryoho* 2000; **27**: 395-403
  - 45 **Yoshino K**, Fujita M, Hirata K, Kunii Y, Kitamura M, Nagawa H, Kubota T, Wakasugi J, Kasai Y, Takahashi Y, Furukawa H, Takao T, Kaibara N, Takashima S, Kakegawa T, Tomita M, Nose Y. Interim report on JFMC Study no. 21 on the effectiveness of UFT as an adjuvant therapy for semi-advanced cancer of the stomach. *Gan To Kagaku Ryoho* 2000; **27**: 263-270
  - 46 **Holland JC**, Marchini A. International psycho-oncology. In: Holland JC (ed) *Psycho-oncology*. New York: Oxford University Press 1998: 1165-1169
  - 47 **van Korlaar I**, Vossen C, Rosendaal F, Cameron L, Bovill E, Kaptein A. Quality of life in venous disease. *Thromb Haemost* 2003; **90**: 27-35

- 48 **Therasse P**, Arbuck SG, Eisenhauer EA, Wanders J, Kaplan RS, Rubinstein L, Verweij J, van Glabbeke M, van Oosterom AT, Christian MC, Gwyther SG. New guidelines to evaluate the response to treatment in solid tumors. *J Nat Cancer Inst* 2000; **92**: 205-216
- 49 **Rothenberg ML**, Moore MJ, Cripps MC, Andersen JS, Portenoy RK, Burris HA, Green MR, Tarassoff PG, Brown TD, Casper ES, Storniolo AM, Von Hoff DD. A phase II trial of gemcitabine in patients with 5-FU-refractory pancreas cancer. *Ann Oncol* 1996; **7**: 347-353
- 50 **Sakamoto J**, Morita S, Yumiba T, Narahara H, Kinoshita K, Nakane Y, Imamoto H, Shiozaki H. A phase II clinical trial to evaluate the effect of paclitaxel in patients with ascites caused by advanced or recurrent gastric carcinoma: a new concept of clinical benefit response for non-measurable type of gastric cancer. *Jpn J Clin Oncol* 2003; **33**: 238-240
- 51 **Maillé AR**, Kaptein AA, de Haes JC, Everaerd WT. Assessing quality of life in chronic non-specific lung disease—a review of empirical studies published between 1980 and 1994. *Qual Life Res* 1996; **5**: 287-301
- 52 **Kaplan RM**. The significance of quality of life in health care. *Qual Life Res* 2003; **12** Suppl 1: 3-16
- 53 **Lepore SJ**, Helgeson VS, Eton DT, Schulz R. Improving quality of life in men with prostate cancer: a randomized controlled trial of group education interventions. *Health Psychol* 2003; **22**: 443-452
- 54 **Persson C**, Glimelius B. The relevance of weight loss for survival and quality of life in patients with advanced gastrointestinal cancer treated with palliative chemotherapy. *Anticancer Res* 2002; **22**: 3661-3668
- 55 **Kuchler T**, Henne-Bruns D, Rappat S, Graul J, Holst K, Williams JL, Wood-Dauphinee S. Impact of psychotherapeutic support on gastrointestinal cancer patients undergoing surgery: survival results of a trial. *Hepatogastroenterology* 1999; **46**: 322-335
- 56 **Bottomley A**, Vanvoorden V, Flechtner H, Therasse P. The challenges and achievements involved in implementing Quality of Life research in cancer clinical trials. *Eur J Cancer* 2003; **39**: 275-285
- 57 **Andersen BL**. Biobehavioral outcomes following psychological interventions for cancer patients. *J Consult Clin Psychol* 2002; **70**: 590-610
- 58 **Rehse B**, Pukrop R. Effects of psychosocial interventions on quality of life in adult cancer patients: meta analysis of 37 published controlled outcome studies. *Patient Educ Couns* 2003; **50**: 179-186
- 59 **Arraras JL**, Wright S, Greimel E, Holzner B, Kuljanic-Vlasic K, Velikova G, Eisemann M, Visser A. Development of a questionnaire to evaluate the information needs of cancer patients: the EORTC questionnaire. *Patient Educ Couns* 2004; **54**: 235-241
- 60 **Brédart A**, Mignot V, Rousseau A, Dolbeault S, Beauloye N, Adam V, Elie C, Léonard I, Asselain B, Conroy T. Validation of the EORTC QLQ-SAT32 cancer inpatient satisfaction questionnaire by self- versus interview assessment comparison. *Patient Educ Couns* 2004; **54**: 207-212
- 61 **Bozzetti F**. Total versus subtotal gastrectomy in cancer of the distal stomach: facts and fantasy. *Eur J Surg Oncol* 1992; **18**: 572-579
- 62 **Detmar SB**, Muller MJ, Schornagel JH, Wever LD, Aaronson NK. Health-related quality-of-life assessments and patient-physician communication: a randomized controlled trial. *JAMA* 2002; **288**: 3027-3034
- 63 **Gilbody SM**, House AO, Sheldon T. Routine administration of Health Related Quality of Life (HRQoL) and needs assessment instruments to improve psychological outcome – a systematic review. *Psychol Med* 2002; **32**: 1345-1356
- 64 **Kaptein AA**, Scharloo M, Helder DI, Kleijn WC, van Korlaar IM, Woertman M. Representations of chronic illnesses. In: Cameron LD, Leventhal H (eds) *The self-regulation of health and illness behaviour*. London: Routledge 2003: 97-118